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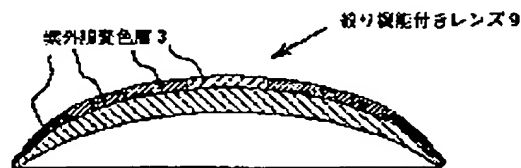
(72)Inventor : MORI FUJIO  
YAMANAKA TSUNEYUKI

## (54) LENS PROVIDED WITH DIAPHRAGMING FUNCTION

## (57)Abstract:

PURPOSE: To eliminate the need for an AE device and to reduce the size, weight and cost of an equipment by imparting a diaphragm function to a UV discoloring layer on the surface of a lens.

CONSTITUTION: A printed film with a UV discoloring layer 3 as one component layer is provided on the surface of a lens to constitute a lens 9 furnished with a diaphragming function, and the strength of the color developed in the layer 3 is progressively increased toward the periphery of the lens. The printed film is formed on the surface of a lens substrate by using a UV discoloring ink obtained by dissolving or dispersing a UV discoloring material in a binder and mixing both materials. In this case, screen printing, offset printing or gravure printing is applied.



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## CLAIMS

### [Claim(s)]

[Claim 1] The lens with a drawing function characterized by becoming high as the printing film which uses an ultraviolet-rays discoloration layer as 1 configuration layer is prepared on a lens front face and the concentration at the time of coloring of an ultraviolet-rays discoloration layer approaches a lens periphery.

[Claim 2] The lens with a drawing function according to claim 1 whose ultraviolet-rays discoloration layer is that to which the content of the ultraviolet-rays discoloration matter becomes high as a lens periphery is approached.

[Claim 3] The lens with a drawing function according to claim 1 whose ultraviolet-rays discoloration layer is that to which thickness becomes large as a lens periphery is approached.

[Claim 4] The lens with a drawing function according to claim 1 whose ultraviolet-rays discoloration layer is that to which the rate of area of a halftone dot becomes high as a lens periphery is approached.

[Claim 5] The manufacture approach of the lens with a drawing function characterized by to exfoliate the base sheet of an imprint sheet after carrying out heating application of pressure of the imprint sheet with which the imprint layer which uses as 1 configuration layer at least the ultraviolet-rays discoloration layer which becomes high was prepared from the base sheet side of superposition and an imprint sheet at a lens as the concentration at the time of coloring approaches on a base sheet at a lens periphery.

[Claim 6] The imprint sheet with which the imprint layer which uses as 1 configuration layer at least the ultraviolet-rays discoloration layer which becomes high as the concentration at the time of coloring approaches on a base sheet at a lens periphery was prepared is arranged on the female mold which has the wall of a lens configuration. Pouring in a lens ingredient on an imprint sheet and carrying out the polymerization of the lens ingredient, after making the base sheet side of an imprint sheet meet the configuration of a female mold, rotate a female mold, and in accordance with the configuration of a female mold, lengthen a lens ingredient thinly to homogeneity and it is fabricated to it. The manufacture approach of the lens with a drawing function characterized by exfoliating the base sheet of ejection and an imprint sheet in a moldings from a female mold.

[Claim 7] The imprint sheet with which the imprint layer which uses as 1 configuration layer at least the ultraviolet-rays discoloration layer which becomes high as the concentration at the time of coloring approaches on a base sheet at a lens periphery was prepared is arranged between the metal mold of the couple which consists of a female mold which has the wall of a lens configuration, and a male. The manufacture approach of the lens with a drawing function

characterized by pouring in a lens ingredient between metal mold, carrying out the polymerization of the lens ingredient, carrying out a mold aperture, and exfoliating the base sheet of ejection and an imprint sheet in a moldings after making the base sheet side of an imprint sheet meet the configuration of a female mold.

[Claim 8] While having the wall of a lens configuration, the imprint sheet with which the imprint layer which uses as 1 configuration layer at least the ultraviolet-rays discoloration layer which becomes high as the concentration at the time of coloring approaches on a base sheet at a lens periphery was prepared Arrange between the metal mold of the couple which becomes a part corresponding to the edge of a lens from the female mold which has an exit hole, and a male, and turn the base sheet side of an imprint sheet to a female mold side, and it is arranged. The manufacture approach of the lens with a drawing function characterized by injecting a lens ingredient in metal mold from an exit hole the mold closure back, carrying out a mold aperture, and exfoliating the base sheet of ejection and an imprint sheet in a moldings.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to a lens with a drawing function with the drawing function in which the lens itself can adjust the amount of transmitted lights according to change of light income, and its manufacture approach. This invention can mainly be used for the lens for cameras.

[0002]

[Description of the Prior Art] Optical instruments, such as a camera and a video camera, have the drawing device in which light income is adjusted according to the brightness of a photographic subject. In order that deciding a suitable drawing value according to the brightness of a photographic subject may require skill of a photography person, the automatic exposure adjusting device (AE equipment) is usually built into the camera. AE equipment consists of the sensor section which senses the brightness of a photographic subject, the command section which extracts according to the sensed brightness and calculates an amount, and the actuation section which moves drawing according to the result.

[0003]

[Problem(s) to be Solved by the Invention] a camera -- lightweight-izing -- in order for the price to miniaturize and fall, it is necessary to carry out the cutback of the mark of the components of AE equipment, a tooth space, and cost

[0004] However, since AE equipment was what consists of the sensor section, the command section, and the actuation section, the limit was shown in attaining lessening the mark of components, and the miniaturization of each part article.

[0005] Then, this invention aims at offering the lens with a drawing function by completely different principle from conventional AE equipment, and its manufacture approach.

[0006]

[Means for Solving the Problem] This invention solved the above problems by extracting to the lens itself and giving a function.

[0007] That is, in order to attain the above object, the printing film which uses an ultraviolet-rays discoloration layer as 1 configuration layer for a lens with a drawing function on a lens front face was prepared, and this invention was constituted so that it might become high, as the concentration at the time of coloring of an ultraviolet-rays discoloration layer approached the lens periphery.

[0008] Moreover, in the above-mentioned lens with a drawing function, this invention may be constituted so that it may be that to which the content of the ultraviolet-rays discoloration

matter becomes high, as an ultraviolet-rays discoloration layer approaches a lens periphery.  
 [0009] Moreover, in the above-mentioned lens with a drawing function, this invention may be constituted so that it may be that to which thickness becomes large, as an ultraviolet-rays discoloration layer approaches a lens periphery.

[0010] Moreover, in the above-mentioned lens with a drawing function, this invention may be constituted so that it may be that to which the rate of area of a halftone dot becomes high, as an ultraviolet-rays discoloration layer approaches a lens periphery.

[0011] Moreover, after carrying out the heating application of pressure of the imprint sheet with which the imprint layer which uses as 1 configuration layer at least the ultraviolet-rays discoloration layer which becomes high was prepared from the base sheet side of superposition and an imprint sheet at a lens as the concentration at the time of coloring approached the manufacture approach of a lens with a drawing function on a base sheet at a lens periphery in order that this invention may attain the above object, it constituted so that the base sheet of an imprint sheet may exfoliate.

[0012] Moreover, this invention is arranged on the female mold which has the wall of a lens configuration for the imprint sheet with which the imprint layer which uses as 1 configuration layer at least the ultraviolet-rays discoloration layer which becomes high about the manufacture approach of a lens with a drawing function as the concentration at the time of coloring approaches on a base sheet at a lens periphery was prepared. Pouring in a lens ingredient on an imprint sheet and carrying out the polymerization of the lens ingredient, after making the base sheet side of an imprint sheet meet the configuration of a female mold, rotate a female mold, and in accordance with the configuration of a female mold, lengthen a lens ingredient thinly to homogeneity and it is fabricated to it. The moldings consisted of female molds so that the base sheet of ejection and an imprint sheet might be exfoliated.

[0013] This invention moreover, the manufacture approach of a lens with a drawing function The imprint sheet with which the imprint layer which uses as 1 configuration layer at least the ultraviolet-rays discoloration layer which becomes high as the concentration at the time of coloring approaches on a base sheet at a lens periphery was prepared is arranged between the metal mold of the couple which consists of a female mold which has the wall of a lens configuration, and a male. After making the base sheet side of an imprint sheet meet the configuration of a female mold, the lens ingredient was poured in between metal mold, the polymerization of the lens ingredient was carried out, the mold aperture was carried out, and the moldings was constituted so that the base sheet of ejection and an imprint sheet might be exfoliated.

[0014] This invention moreover, the manufacture approach of a lens with a drawing function While having the wall of a lens configuration, the imprint sheet with which the imprint layer which uses as 1 configuration layer at least the ultraviolet-rays discoloration layer which becomes high as the concentration at the time of coloring approaches on a base sheet at a lens periphery was prepared Arrange between the metal mold of the couple which becomes a part corresponding to the edge of a lens from the female mold which has an exit hole, and a male, and turn the base sheet side of an imprint sheet to a female mold side, and it is arranged. The lens ingredient was injected in metal mold from the exit hole the mold closure back, the mold aperture was carried out, and the moldings was constituted so that the base sheet of ejection and an imprint sheet might be exfoliated.

[0015] This invention is explained in more detail, referring to a drawing.

[0016] Drawing 1 - drawing 2 are the typical sectional views showing one example of the lens

with a drawing function of this invention. Drawing 3 - drawing 5 are the typical sectional views showing a part of one example of the lens with a drawing function of this invention. Drawing 6 is the sectional view showing the imprint sheet used for the manufacture approach of the lens with a drawing function this invention. Drawing 7 is the sectional view showing one example of the manufacture approach of the lens with a drawing function of this invention. Drawing 8 is the perspective view showing one example of the lens with a drawing function of this invention. Drawing 9 - drawing 11 are the sectional views showing one example of the manufacture approach of the lens with a drawing function of this invention. Drawing 12 is the sectional view showing other examples of the process which makes an imprint sheet meet metal mold.

[0017] 1 -- an imprint sheet and 2 -- a base sheet and 3 -- an ultraviolet-rays discoloration layer and 4 -- an imprint layer and 5 -- a female mold and 6 -- a male and 7 -- a lens ingredient and 8 -- an additive and 9 -- extracting -- a lens with a function, and 10 -- vacuum attraction opening and 11 -- an exit hole and 12 -- for stratum disjunctum and 15, as for the pad for hot printing, and 18, a glue line and 16 are [ a pin and 13 / a crevice and 14 / a mold release layer and 19 ] moldingses.

[0018] The lens 9 with a drawing function of this invention prepares the printing film which uses the ultraviolet-rays discoloration layer 3 as 1 configuration layer on a lens front face, and it constitutes it so that it may become high, as the concentration at the time of coloring of the ultraviolet-rays discoloration layer 3 approaches a lens periphery (refer to drawing 1 ).

[0019] It is good to use the ultraviolet-rays discoloration ink with which the binder was made to dissolve or distribute ultraviolet-rays discoloration material, and it mixed as the formation approach of the printing film which uses the ultraviolet-rays discoloration layer 3 as 1 configuration layer, and to form in a lens base material front face by print processes. There are screen printing, offset printing, gravure, etc. as print processes.

[0020] As ultraviolet-rays discoloration matter, there are organic system photochromic ingredients, such as a SUPIRO pyran system compound, a dihydroindolizine system compound, a fulgide system compound, a TETROBENZOPEROPIREN derivative, a JIHIDORI pyrene system compound, a thioindigo system compound, an anthra SENOFAN derivative, a viologen system compound, and diphenylthiocarbazone metallic compounds. Moreover, inorganic system photochromic ingredients, such as a silver halide, can also be used.

[0021] As a binder, thermoplastics, such as vinyl chloride vinyl acetate copolymer system resin, polyamide system resin, polyester system resin, thermoplastic urethane system resin, polyvinyl-acetal system resin, thermoplastic acrylic resin, chlorinated-rubber system resin, chlorination polyethylene system resin, a chlorination polypropylene resin, meta-acrylic resin, and acrylic ester system resin, can be used. Moreover, thermosetting resin, such as melamine system resin, silicon system resin, epoxy system resin, heat-curing acrylic resin, and heat-curing urethane system resin, can be used. Moreover, inorganic binders, such as oxidization silicon, can be used. Usually, since it is required that the printing film sticks glass or polymethylmethacrylate system resin to a lens firmly in consideration of using as a lens and for the printing film to have transparency, abrasion resistance, a degree of hardness, and endurance, it is most desirable also in these binders to use acrylic resin.

[0022] The ultraviolet-rays discoloration layer 3 is constituted so that it may become high, as the concentration at the time of coloring approaches a lens periphery. That is, the ultraviolet-rays discoloration layer 3 makes low concentration at the time of coloring of a lens center section, and it is made for the concentration at the time of coloring to become high as a lens periphery is approached. Even if it changes the concentration at the time of coloring gradually, it

may be changed in stepless. In order to form the ultraviolet-rays discoloration layer 3 so that the concentration at the time of coloring may change, it may constitute so that the content of the ultraviolet-rays discoloration matter may become high, as a lens periphery is approached (refer to drawing 3 ). Moreover, it may constitute so that thickness may become large, as a lens periphery is approached (refer to drawing 4 ). The thickness of the ultraviolet-rays discoloration layer 3 can be changed by adjusting the number of mesh and printing conditions of the printing version. Moreover, it may constitute so that the rate of area of a halftone dot may become high, as a lens periphery is approached (refer to drawing 5 ). The rate of area of the halftone dot of ultraviolet-rays discoloration layer 3 pattern can be changed by adjusting the pattern of the printing version.

[0023] In addition, in order to raise endurance further, the front face of the lens 9 with a drawing function may be covered with inorganic substances, such as titanium oxide and colloidal silica, on the ultraviolet-rays discoloration layer 3.

[0024] Moreover, there is a replica method using the imprint sheet 1 as an approach of forming the ultraviolet-rays discoloration layer 3 of the lens 9 with a drawing function of this invention. Next, a replica method is explained.

[0025] First, the imprint sheet 1 is prepared.

[0026] The imprint sheet 1 forms the imprint layer 4 which uses the ultraviolet-rays discoloration layer 3 as 1 configuration layer at least on the base sheet 2 (refer to drawing 6 ).

[0027] The base sheet 2 supports the imprint layer 4, extracts it after an imprint, and carries out exfoliation clearance from the lens 9 with a function. As construction material of the base sheet 2, plastic films which processing tends to carry out, such as polyester system resin, a polypropylene resin, polyethylene system resin, polycarbonate system resin, and polystyrene system resin, are desirable. Moreover, a synthetic paper, pearl paper, etc. can also be used.

[0028] Moreover, in order to give detachability to the base sheet 2, the mold release layer 18 which exfoliates with the base sheet 2 after an imprint may be formed on the base sheet 2. As construction material of the mold release layer 18, melamine system resin, silicon system resin, fluorine system resin, cellulose type resin, urea system resin, olefin system resin, paraffin series resin, etc. can be used. Moreover, as 1 configuration layer of the imprint layer 4, it exfoliates from the base sheet 2 after an imprint, and the stratum disjunctum 14 which remains in the lens 9 side with a drawing function may be formed on the base sheet 2. As construction material of stratum disjunctum 14, resin, such as acrylic resin, polyester system resin, an alkyd resin, and vinyl chloride vinyl acetate copolymer system resin, can be used. As the formation approach of the mold release layer 18 and stratum disjunctum 14, there are the coat methods, such as the printing approaches, such as gravure and screen printing, and the roll coat method, a spray coating method.

[0029] Into an ink binder, the ultraviolet-rays discoloration layer 3 makes the ultraviolet-rays discoloration matter contain, and can set up the depth of shade by the ratio and printing thickness of an ink binder and the ultraviolet-rays discoloration matter. The thing same as ultraviolet-rays discoloration matter as the case of the ultraviolet-rays discoloration ink explained previously can be used. The thing same as construction material of an ink binder as the case of the ultraviolet-rays discoloration ink explained previously can be used. As the formation approach of the ultraviolet-rays discoloration layer 3, there are gravure, screen printing, offset printing, a flexographic printing method, etc.

[0030] Moreover, a glue line 15 may be formed on the ultraviolet-rays discoloration layer 3 as 1 configuration layer of the imprint layer 4, and the adhesive property over the lens 9 with a



drawing function may be raised. As construction material of a glue line 15, acrylic resin, vinyl chloride vinyl acetate system resin, a chlorination polypropylene resin, ethylene vinyl acetate system resin, etc. can be used. As the formation approach of a glue line 15, there are the coat methods, such as the printing approaches, such as gravure and screen printing, and the roll coat method, a spray coating method.

[0031] Moreover, an ultraviolet-rays discoloration matter protective layer may be formed between the base sheet 2 and the ultraviolet-rays discoloration layer 3 as 1 configuration layer of the imprint layer 4 (not shown). An ultraviolet-rays discoloration matter protective layer prevents the ultraviolet-rays discoloration matter in the ultraviolet-rays discoloration layer 3 extracting through stratum disjunctum 14, and eluting it out of the lens 9 with a function directly, when washing etc. carries out the lens 9 with a drawing function. Moreover, an ultraviolet-rays discoloration matter protective layer also has the operation which prevents the ultraviolet-rays discoloration layer 3 getting damaged. It is good to use the same thing as lens ingredients, such as polymethylmethacrylate system resin, polyhydroxyethyl methacrylate system resin, polyvinyl PIRODORIN system resin, and silicon copolymer system resin, as construction material of an ultraviolet-rays discoloration matter protective layer. As the formation approach of an ultraviolet-rays discoloration matter protective layer, there are the coat methods, such as the printing approaches, such as gravure and screen printing, and the roll coat method, a spray coating method.

[0032] The lens 9 with a drawing function can be obtained using the imprint sheet 1 of the above configurations.

[0033] Arrange the imprint sheet 1 in the lower part of the pad 16 for hot printing set as the temperature of 200–250 degrees C (refer to drawing 7 ), press it from the tooth back of the imprint layer 4, it is made to meet in the shape of [ of the imprint layer 4 of the imprint sheet 1, and a lens 9 ] surface type, and is held for several seconds. Then, it exfoliates, the base sheet 2 is extracted from a lens 9, and the lens 9 with a function is obtained (refer to drawing 8 ).

[0034] Moreover, it can extract by the approach of 1–3 shown below, and the ultraviolet-rays discoloration layer 3 can be formed in lens 9 with a drawing function front face at shaping of the lens 9 with a function, and coincidence.

[0035] 1. Arrange the imprint sheet 1 on the female mold 5 which has the wall of a lens configuration (refer to drawing 9 a ). Next, air is attracted from the vacuum attraction opening 10, and the base sheet 2 side of the imprint sheet 1 is made to meet the configuration of a female mold 5 (refer to drawing 9 b ). In this case, if there is need, it will carry out, applying heat to the imprint sheet 1.

[0036] Next, while pouring in the lens ingredient 7 on the imprint sheet 1 (refer to drawing 9 c ) and carrying out the polymerization of the lens ingredient 7, in accordance with the configuration of a female mold 5, it lengthens thinly to homogeneity by rotating a female mold 5 centering on the vertical line passing through the core. At this time, in order to help a polymerization, the additives 8, such as a catalyst and a curing agent, may be added before impregnation of the lens ingredient 7 or after impregnation. Moreover, the polymerization of the lens ingredient 7 may be carried out only in an operation of an additive 8, without heating. As a lens ingredient 7, polymethylmethacrylate system resin, polyhydroxyethyl methacrylate system resin, polyvinyl PIRODORIN system resin, silicon copolymer system resin, etc. can be used.

[0037] After a polymerization is completed and a moldings 19 is fabricated (refer to drawing 9 d ), the base sheet 2 of the imprint sheet 1 is exfoliated from a moldings 19, and the lens 9 with a drawing function is obtained (refer to drawing 9 e ). In addition, in case metal mold is designed, it

is necessary to make it the thickness of the base material sheet 2 not influence the curve of the lens 9 with a drawing function in consideration of the thickness of the base sheet 2 of the imprint sheet 1.

[0038] 2. Arrange the imprint sheet 1 between the metal mold of the couple which consists of a female mold 5 which has the wall of a lens configuration, and a male 6 (refer to drawing 10 a). Next, the imprint sheet 1 is made to meet the configuration of a female mold 5 like the approach of 1 (refer to drawing 10 b).

[0039] Next, the lens ingredient 7 is poured in between metal mold (refer to drawing 10 c), and the polymerization of the lens ingredient 7 is carried out within metal mold by heating the lens ingredient 7 to the mold closure back (refer to drawing 10 d). At this time, in order to help a polymerization, the additives 8, such as a catalyst and a curing agent, may be added before impregnation of the lens ingredient 7 or after impregnation. Moreover, the polymerization of the lens ingredient 7 may be carried out only in an operation of an additive 8, without heating. In addition, although addition of an additive 8 is performed before impregnation of the lens ingredient 7 or after impregnation, it is necessary to warn against completing a polymerization before shaping.

[0040] After a polymerization is completed and a moldings 19 is fabricated, the base sheet 2 of the imprint sheet 1 is exfoliated from a moldings 19, and the lens 9 with a drawing function is obtained (refer to drawing 10 e).

[0041] 3. It has the wall of a lens configuration for the imprint sheet 1, and arrange between the metal mold of the couple which becomes a part corresponding to the edge of a lens from the female mold 5 which has an exit hole 11, and a male 6 (refer to drawing 11 a). Next, the imprint sheet 1 is made to meet the configuration of a female mold 5 like the approach of 1. The lens ingredient 7 is injected and fabricated in metal mold from an exit hole 11 the mold closure back (refer to drawing 11 b) (refer to drawing 11 c). Next, the base sheet 2 of the imprint sheet 1 is exfoliated from an aperture and a moldings 19 in metal mold, and the lens 9 with a drawing function is obtained (refer to drawing 11 d).

[0042] In addition, there is also a method of pushing in the imprint sheet 1 by the pin 12 which carried out the configuration which agrees with metal mold while applying heat, and making metal mold meet in addition to the approach of attracting air and making it meeting through the vacuum attraction opening 10 from the base sheet 2 side, applying heat as the imprint sheet 1 of the approach of the above 1-3 was shown in drawing 9 - drawing 11 in the process which metal mold is made meeting (refer to drawing 12 ). Moreover, the approach of drawing in and the approach of pressing a pin may be used together.

[0043] A crevice 13 is formed on the lens 9 with a drawing function, the imprint layer 4 is formed in a crevice 13, the lens 9 with a drawing function obtained by the above-mentioned approach is stopped down as the front face of the imprint layer 4, and lens 9 with a function front face does not have a level difference, and turns into the same side.

[0044]

[Function] Since the lens with a drawing function and its manufacture approach of this invention were constituted as mentioned above, they have the next operation.

[0045] The part into which the ultraviolet-rays discoloration layer colored from the lens periphery with a drawing function, and it colored the ultraviolet-rays discoloration layer prepared in the lens front face when the amount of ultraviolet rays increased, since the concentration at the time of coloring constituted the lens with a drawing function of this invention like [ it is high and ] as it approached the lens periphery intercepts light for the role of drawing sure enough

(refer to drawing 1 ). If the amount of ultraviolet rays decreases, coloring concentration will decrease from a part for a lens center section with a drawing function (decolorization), there will be much light and close will come (refer to drawing 2 ) to come.

[0046] Moreover, since the manufacture approach of the lens with a drawing function this invention was constituted so that a base sheet might be exfoliated after it stuck the imprint sheet into the lens or the lens ingredient, an ultraviolet-rays discoloration layer is formed in the location of arbitration.

[0047]

[Example] Carried out the roll coat of the silicon system ink to polyester film with a thickness of 25 micrometers, it was made to dry at 150 degrees C for about 30 minutes, and the mold release layer was formed.

[0048] Next, the roll coat of the acrylic ink was carried out, and stratum disjunctum was formed.

[0049] Next, using the ultraviolet-rays allochroic ink of the presentation 1 shown below, the printing pattern of a with a bore outer diameter [ 6mm outer diameter of 4mm ] doughnut mold was printed with screen printing, and the 1st ultraviolet-rays discoloration layer was formed.

[0050] Next, using the ultraviolet-rays allochroic ink of the presentation 2 shown below, the printing pattern of a with a bore outer diameter [ 8mm outer diameter of 6mm ] doughnut mold was printed with screen printing, and the 2nd ultraviolet-rays discoloration layer was formed.

[0051] Next, using the ultraviolet-rays allochroic ink of the presentation 3 shown below, the printing pattern of a with a bore outer diameter [ 10mm outer diameter of 8mm ] doughnut mold was printed with screen printing, and the 3rd ultraviolet-rays discoloration layer was formed.

[0052] Next, using the acrylic ink of the presentation 4 shown below, it printed with screen printing and the glue line was formed.

[0053] Finally, it dried at 150 degrees C for about 5 minutes, and the imprint sheet was obtained.

[0054]

Presentation 1 (the 1st ultraviolet-rays allochroic ink)

Binder 700 by SEIKO advance incorporated company 60 % of the weight Dilution solvent Ethyl carbitol acetate 15 % of the weight Ultraviolet-rays discoloration matter Sunny color powder by record raw material research institute incorporated company 25 % of the weight [0055]

Presentation 2 (the 2nd ultraviolet-rays allochroic ink)

Binder 700 by SEIKO advance incorporated company 48 % of the weight Dilution solvent Ethyl carbitol acetate 12 % of the weight Ultraviolet-rays discoloration matter Sunny color powder by record raw material research institute incorporated company 40 % of the weight [0056]

Presentation 3 (the 3rd ultraviolet-rays allochroic ink)

Binder 700 by SEIKO advance incorporated company 42 % of the weight Dilution solvent Ethyl carbitol acetate 10 % of the weight Ultraviolet-rays discoloration matter Sunny color powder by record raw material research institute incorporated company 48 % of the weight [0057]

Presentation 4 (adhesion ink)

binder the Mitsubishi Rayon Co., Ltd. make -- BR-80 80 % of the weight Dilution solvent Ethyl carbitol acetate 20 % of the weight [0058] Thus, the obtained imprint sheet was used, and it laid in the lens front face made from polymethylmethacrylate, and pressed with the roll imprint machine, and it exfoliated, the imprint sheet was extracted, and the lens with a function was obtained.

[0059] The following results were obtained, when [ which manufactured ] it extracted and the lens with a function was evaluated.

[0060] 1. It is Average Ultraviolet-Rays on-the-Strength 0.52 MV/cm<sup>2</sup> 1st Ultraviolet-Rays Allochroic Layer after Transparency at the Time of UV Irradiation on-the-Strength 2.0 MV/cm<sup>2</sup>. 2nd Ultraviolet-Rays [ of 90% Coloring ] Allochroic Layer 3rd Ultraviolet-Rays [ of 100% Coloring ] Allochroic Layer 100% Coloring [0061] 2. It is Average Ultraviolet-Rays on-the-Strength 0.45 MV/cm<sup>2</sup> 1st Ultraviolet-Rays Allochroic Layer after Transparency at the Time of UV Irradiation on-the-Strength 1.0 MV/cm<sup>2</sup>. It Does Not Color but is 2nd Ultraviolet-Rays Allochroic Layer. 3rd Ultraviolet-Rays [ of 20% Coloring ] Allochroic Layer 100% Coloring [0062] 3. It is Average Ultraviolet-Rays on-the-Strength 0.43 MV/cm<sup>2</sup> 1st Ultraviolet-Rays Allochroic Layer after Transparency at the Time of UV Irradiation on-the-Strength 0.5 MV/cm<sup>2</sup>. It Does Not Color but is 2nd Ultraviolet-Rays Allochroic Layer. It Does Not Color but is 3rd Ultraviolet-Rays Allochroic Layer. 5% Coloring [0063] The average ultraviolet-rays reinforcement after transparency became almost fixed at the time of UV irradiation reinforcement 0.5 – 2.0 mV/cm<sup>2</sup>.

[0064]

[Effect of the Invention] Since the lens with a drawing function and its manufacture approach of this invention consist of above configurations and operations, it has the following effectiveness.

[0065] Since the ultraviolet-rays discoloration layer prepared in the lens front face stops down the lens with a drawing function of this invention and it has the function, AE equipment becomes unnecessary and lightweight-izing of an optical instrument, a miniaturization, and low-pricing are attained.

[0066] Moreover, since the manufacture approach of the lens with a drawing function this invention can form an ultraviolet-rays discoloration layer in the location of the arbitration of a lens or a lens ingredient, it can obtain a lens with a drawing function easily. Moreover, various ultraviolet-rays discoloration layers can be prepared only by changing an imprint sheet.

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**TECHNICAL FIELD**

[Industrial Application] This invention relates to a lens with a drawing function with the drawing function in which the lens itself can adjust the amount of transmitted lights according to change of light income, and its manufacture approach. This invention can mainly be used for the lens for cameras.

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**PRIOR ART**

[Description of the Prior Art] Optical instruments, such as a camera and a video camera, have the drawing device in which light income is adjusted according to the brightness of a photographic subject. In order that deciding a suitable drawing value according to the brightness of a photographic subject may require skill of a photography person, the automatic exposure adjusting device (AE equipment) is usually built into the camera. AE equipment consists of the sensor section which senses the brightness of a photographic subject, the command section which extracts according to the sensed brightness and calculates an amount, and the actuation section which moves drawing according to the result.

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EFFECT OF THE INVENTION

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[Effect of the Invention] Since the lens with a drawing function and its manufacture approach of this invention consist of above configurations and operations, it has the following effectiveness.

[0065] Since the ultraviolet-rays discoloration layer prepared in the lens front face stops down the lens with a drawing function of this invention and it has the function, AE equipment becomes unnecessary and lightweight-izing of an optical instrument, a miniaturization, and low-pricing are attained.

[0066] Moreover, since the manufacture approach of the lens with a drawing function this invention can form an ultraviolet-rays discoloration layer in the location of the arbitration of a lens or a lens ingredient, it can obtain a lens with a drawing function easily. Moreover, various ultraviolet-rays discoloration layers can be prepared only by changing an imprint sheet.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] a camera -- lightweight-izing -- in order for the price to miniaturize and fall, it is necessary to carry out the cutback of the mark of the components of AE equipment, a tooth space, and cost  
[0004] However, since AE equipment was what consists of the sensor section, the command section, and the actuation section, the limit was shown in attaining lessening the mark of components, and the miniaturization of each part article.  
[0005] Then, this invention aims at offering the lens with a drawing function by completely different principle from conventional AE equipment, and its manufacture approach.

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MEANS

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[Means for Solving the Problem] This invention solved the above problems by extracting to the lens itself and giving a function.

[0007] That is, in order to attain the above object, the printing film which uses an ultraviolet-rays discoloration layer as 1 configuration layer for a lens with a drawing function on a lens front face was prepared, and this invention was constituted so that it might become high, as the concentration at the time of coloring of an ultraviolet-rays discoloration layer approached the lens periphery.

[0008] Moreover, in the above-mentioned lens with a drawing function, this invention may be constituted so that it may be that to which the content of the ultraviolet-rays discoloration matter becomes high, as an ultraviolet-rays discoloration layer approaches a lens periphery.

[0009] Moreover, in the above-mentioned lens with a drawing function, this invention may be constituted so that it may be that to which thickness becomes large, as an ultraviolet-rays discoloration layer approaches a lens periphery.

[0010] Moreover, in the above-mentioned lens with a drawing function, this invention may be constituted so that it may be that to which the rate of area of a halftone dot becomes high, as an ultraviolet-rays discoloration layer approaches a lens periphery.

[0011] Moreover, after carrying out the heating application of pressure of the imprint sheet with which the imprint layer which uses as 1 configuration layer at least the ultraviolet-rays discoloration layer which becomes high was prepared from the base sheet side of superposition and an imprint sheet at a lens as the concentration at the time of coloring approached the manufacture approach of a lens with a drawing function on a base sheet at a lens periphery in order that this invention may attain the above object, it constituted so that the base sheet of an imprint sheet may exfoliate.

[0012] Moreover, this invention is arranged on the female mold which has the wall of a lens configuration for the imprint sheet with which the imprint layer which uses as 1 configuration layer at least the ultraviolet-rays discoloration layer which becomes high about the manufacture approach of a lens with a drawing function as the concentration at the time of coloring approaches on a base sheet at a lens periphery was prepared. Pouring in a lens ingredient on an imprint sheet and carrying out the polymerization of the lens ingredient, after making the base sheet side of an imprint sheet meet the configuration of a female mold, rotate a female mold, and in accordance with the configuration of a female mold, lengthen a lens ingredient thinly to homogeneity and it is fabricated to it. The moldings consisted of female molds so that the base sheet of ejection and an imprint sheet might be exfoliated.

[0013] This invention moreover, the manufacture approach of a lens with a drawing function The

imprint sheet with which the imprint layer which uses as 1 configuration layer at least the ultraviolet-rays discoloration layer which becomes high as the concentration at the time of coloring approaches on a base sheet at a lens periphery was prepared is arranged between the metal mold of the couple which consists of a female mold which has the wall of a lens configuration, and a male. After making the base sheet side of an imprint sheet meet the configuration of a female mold, the lens ingredient was poured in between metal mold, the polymerization of the lens ingredient was carried out, the mold aperture was carried out, and the moldings was constituted so that the base sheet of ejection and an imprint sheet might be exfoliated.

[0014] This invention moreover, the manufacture approach of a lens with a drawing function While having the wall of a lens configuration, the imprint sheet with which the imprint layer which uses as 1 configuration layer at least the ultraviolet-rays discoloration layer which becomes high as the concentration at the time of coloring approaches on a base sheet at a lens periphery was prepared Arrange between the metal mold of the couple which becomes a part corresponding to the edge of a lens from the female mold which has an exit hole, and a male, and turn the base sheet side of an imprint sheet to a female mold side, and it is arranged. The lens ingredient was injected in metal mold from the exit hole the mold closure back, the mold aperture was carried out, and the moldings was constituted so that the base sheet of ejection and an imprint sheet might be exfoliated.

[0015] This invention is explained in more detail, referring to a drawing.

[0016] Drawing 1 - drawing 2 are the typical sectional views showing one example of the lens with a drawing function of this invention. Drawing 3 - drawing 5 are the typical sectional views showing a part of one example of the lens with a drawing function of this invention. Drawing 6 is the sectional view showing the imprint sheet used for the manufacture approach of the lens with a drawing function this invention. Drawing 7 is the sectional view showing one example of the manufacture approach of the lens with a drawing function of this invention. Drawing 8 is the perspective view showing one example of the lens with a drawing function of this invention. Drawing 9 - drawing 11 are the sectional views showing one example of the manufacture approach of the lens with a drawing function of this invention. Drawing 12 is the sectional view showing other examples of the process which makes an imprint sheet meet metal mold.

[0017] 1 -- an imprint sheet and 2 -- a base sheet and 3 -- an ultraviolet-rays discoloration layer and 4 -- an imprint layer and 5 -- a female mold and 6 -- a male and 7 -- a lens ingredient and 8 -- an additive and 9 -- extracting -- a lens with a function, and 10 -- vacuum attraction opening and 11 -- an exit hole and 12 -- for stratum disjunctum and 15, as for the pad for hot printing, and 18, a glue line and 16 are [ a pin and 13 / a crevice and 14 / a mold release layer and 19 ] moldingses.

[0018] The lens 9 with a drawing function of this invention prepares the printing film which uses the ultraviolet-rays discoloration layer 3 as 1 configuration layer on a lens front face, and it constitutes it so that it may become high, as the concentration at the time of coloring of the ultraviolet-rays discoloration layer 3 approaches a lens periphery (refer to drawing 1 ).

[0019] It is good to use the ultraviolet-rays discoloration ink with which the binder was made to dissolve or distribute ultraviolet-rays discoloration material, and it mixed as the formation approach of the printing film which uses the ultraviolet-rays discoloration layer 3 as 1 configuration layer, and to form in a lens base material front face by print processes. There are screen printing, offset printing, gravure, etc. as print processes.

[0020] As ultraviolet-rays discoloration matter, there are organic system photochromic

ingredients, such as a SUPIRO pyran system compound, a dihydroindolizine system compound, a fulgide system compound, a TETOROBENZOPEROPIREN derivative, a JIHIDORI pyrene system compound, a thioindigo system compound, an anthra SENOFAN derivative, a viologen system compound, and diphenylthiocarbazone metallic compounds. Moreover, inorganic system photochromic ingredients, such as a silver halide, can also be used.

[0021] As a binder, thermoplastics, such as vinyl chloride vinyl acetate copolymer system resin, polyamide system resin, polyester system resin, thermoplastic urethane system resin, polyvinyl-acetal system resin, thermoplastic acrylic resin, chlorinated-rubber system resin, chlorination polyethylene system resin, a chlorination polypropylene resin, meta-acrylic resin, and acrylic ester system resin, can be used. Moreover, thermosetting resin, such as melamine system resin, silicon system resin, epoxy system resin, heat-curing acrylic resin, and heat-curing urethane system resin, can be used. Moreover, inorganic binders, such as oxidization silicon, can be used. Usually, since it is required that the printing film sticks glass or polymethylmethacrylate system resin to a lens firmly in consideration of using as a lens and for the printing film to have transparency, abrasion resistance, a degree of hardness, and endurance, it is most desirable also in these binders to use acrylic resin.

[0022] The ultraviolet-rays discoloration layer 3 is constituted so that it may become high, as the concentration at the time of coloring approaches a lens periphery. That is, the ultraviolet-rays discoloration layer 3 makes low concentration at the time of coloring of a lens center section, and it is made for the concentration at the time of coloring to become high as a lens periphery is approached. Even if it changes the concentration at the time of coloring gradually, it may be changed in stepless. In order to form the ultraviolet-rays discoloration layer 3 so that the concentration at the time of coloring may change, it may constitute so that the content of the ultraviolet-rays discoloration matter may become high, as a lens periphery is approached (refer to drawing 3 ). Moreover, it may constitute so that thickness may become large, as a lens periphery is approached (refer to drawing 4 ). The thickness of the ultraviolet-rays discoloration layer 3 can be changed by adjusting the number of mesh and printing conditions of the printing version. Moreover, it may constitute so that the rate of area of a halftone dot may become high, as a lens periphery is approached (refer to drawing 5 ). The rate of area of the halftone dot of ultraviolet-rays discoloration layer 3 pattern can be changed by adjusting the pattern of the printing version.

[0023] In addition, in order to raise endurance further, the front face of the lens 9 with a drawing function may be covered with inorganic substances, such as titanium oxide and colloidal silica, on the ultraviolet-rays discoloration layer 3.

[0024] Moreover, there is a replica method using the imprint sheet 1 as an approach of forming the ultraviolet-rays discoloration layer 3 of the lens 9 with a drawing function of this invention. Next, a replica method is explained.

[0025] First, the imprint sheet 1 is prepared.

[0026] The imprint sheet 1 forms the imprint layer 4 which uses the ultraviolet-rays discoloration layer 3 as 1 configuration layer at least on the base sheet 2 (refer to drawing 6 ).

[0027] The base sheet 2 supports the imprint layer 4, extracts it after an imprint, and carries out exfoliation clearance from the lens 9 with a function. As construction material of the base sheet 2, plastic films which processing tends to carry out, such as polyester system resin, a polypropylene resin, polyethylene system resin, polycarbonate system resin, and polystyrene system resin, are desirable. Moreover, a synthetic paper, pearl paper, etc. can also be used.

[0028] Moreover, in order to give detachability to the base sheet 2, the mold release layer 18

which exfoliates with the base sheet 2 after an imprint may be formed on the base sheet 2. As construction material of the mold release layer 18, melamine system resin, silicon system resin, fluorine system resin, cellulose type resin, urea system resin, olefin system resin, paraffin series resin, etc. can be used. Moreover, as 1 configuration layer of the imprint layer 4, it exfoliates from the base sheet 2 after an imprint, and the stratum disjunctum 14 which remains in the lens 9 side with a drawing function may be formed on the base sheet 2. As construction material of stratum disjunctum 14, resin, such as acrylic resin, polyester system resin, an alkyd resin, and vinyl chloride vinyl acetate copolymer system resin, can be used. As the formation approach of the mold release layer 18 and stratum disjunctum 14, there are the coat methods, such as the printing approaches, such as gravure and screen printing, and the roll coat method, a spray coating method.

[0029] Into an ink binder, the ultraviolet-rays discoloration layer 3 makes the ultraviolet-rays discoloration matter contain, and can set up the depth of shade by the ratio and printing thickness of an ink binder and the ultraviolet-rays discoloration matter. The thing same as ultraviolet-rays discoloration matter as the case of the ultraviolet-rays discoloration ink explained previously can be used. The thing same as construction material of an ink binder as the case of the ultraviolet-rays discoloration ink explained previously can be used. As the formation approach of the ultraviolet-rays discoloration layer 3, there are gravure, screen printing, offset printing, a flexographic printing method, etc.

[0030] Moreover, a glue line 15 may be formed on the ultraviolet-rays discoloration layer 3 as 1 configuration layer of the imprint layer 4, and the adhesive property over the lens 9 with a drawing function may be raised. As construction material of a glue line 15, acrylic resin, vinyl chloride vinyl acetate system resin, a chlorination polypropylene resin, ethylene vinyl acetate system resin, etc. can be used. As the formation approach of a glue line 15, there are the coat methods, such as the printing approaches, such as gravure and screen printing, and the roll coat method, a spray coating method.

[0031] Moreover, an ultraviolet-rays discoloration matter protective layer may be formed between the base sheet 2 and the ultraviolet-rays discoloration layer 3 as 1 configuration layer of the imprint layer 4 (not shown). An ultraviolet-rays discoloration matter protective layer prevents the ultraviolet-rays discoloration matter in the ultraviolet-rays discoloration layer 3 extracting through stratum disjunctum 14, and eluting it out of the lens 9 with a function directly, when washing etc. carries out the lens 9 with a drawing function. Moreover, an ultraviolet-rays discoloration matter protective layer also has the operation which prevents the ultraviolet-rays discoloration layer 3 getting damaged. It is good to use the same thing as lens ingredients, such as polymethylmethacrylate system resin, polyhydroxyethyl methacrylate system resin, polyvinyl PIRODORIN system resin, and silicon copolymer system resin, as construction material of an ultraviolet-rays discoloration matter protective layer. As the formation approach of an ultraviolet-rays discoloration matter protective layer, there are the coat methods, such as the printing approaches, such as gravure and screen printing, and the roll coat method, a spray coating method.

[0032] The lens 9 with a drawing function can be obtained using the imprint sheet 1 of the above configurations.

[0033] Arrange the imprint sheet 1 in the lower part of the pad 16 for hot printing set as the temperature of 200-250 degrees C (refer to drawing 7 ), press it from the tooth back of the imprint layer 4, it is made to meet in the shape of [ of the imprint layer 4 of the imprint sheet 1, and a lens 9 ] surface type, and is held for several seconds. Then, it exfoliates, the base sheet 2

is extracted from a lens 9, and the lens 9 with a function is obtained (refer to drawing 8 ).

[0034] Moreover, it can extract by the approach of 1-3 shown below, and the ultraviolet-rays discoloration layer 3 can be formed in lens 9 with a drawing function front face at shaping of the lens 9 with a function, and coincidence.

[0035] 1. Arrange the imprint sheet 1 on the female mold 5 which has the wall of a lens configuration (refer to drawing 9 a). Next, air is attracted from the vacuum attraction opening 10, and the base sheet 2 side of the imprint sheet 1 is made to meet the configuration of a female mold 5 (refer to drawing 9 b). In this case, if there is need, it will carry out, applying heat to the imprint sheet 1.

[0036] Next, while pouring in the lens ingredient 7 on the imprint sheet 1 (refer to drawing 9 c) and carrying out the polymerization of the lens ingredient 7, in accordance with the configuration of a female mold 5, it lengthens thinly to homogeneity by rotating a female mold 5 centering on the vertical line passing through the core. At this time, in order to help a polymerization, the additives 8, such as a catalyst and a curing agent, may be added before impregnation of the lens ingredient 7 or after impregnation. Moreover, the polymerization of the lens ingredient 7 may be carried out only in an operation of an additive 8, without heating. As a lens ingredient 7, polymethylmethacrylate system resin, polyhydroxyethyl methacrylate system resin, polyvinyl PIRODORIN system resin, silicon copolymer system resin, etc. can be used.

[0037] After a polymerization is completed and a moldings 19 is fabricated (refer to drawing 9 d), the base sheet 2 of the imprint sheet 1 is exfoliated from a moldings 19, and the lens 9 with a drawing function is obtained (refer to drawing 9 e). In addition, in case metal mold is designed, it is necessary to make it the thickness of the base material sheet 2 not influence the curve of the lens 9 with a drawing function in consideration of the thickness of the base sheet 2 of the imprint sheet 1.

[0038] 2. Arrange the imprint sheet 1 between the metal mold of the couple which consists of a female mold 5 which has the wall of a lens configuration, and a male 6 (refer to drawing 10 a). Next, the imprint sheet 1 is made to meet the configuration of a female mold 5 like the approach of 1 (refer to drawing 10 b).

[0039] Next, the lens ingredient 7 is poured in between metal mold (refer to drawing 10 c), and the polymerization of the lens ingredient 7 is carried out within metal mold by heating the lens ingredient 7 to the mold closure back (refer to drawing 10 d). At this time, in order to help a polymerization, the additives 8, such as a catalyst and a curing agent, may be added before impregnation of the lens ingredient 7 or after impregnation. Moreover, the polymerization of the lens ingredient 7 may be carried out only in an operation of an additive 8, without heating. In addition, although addition of an additive 8 is performed before impregnation of the lens ingredient 7 or after impregnation, it is necessary to warn against completing a polymerization before shaping.

[0040] After a polymerization is completed and a moldings 19 is fabricated, the base sheet 2 of the imprint sheet 1 is exfoliated from a moldings 19, and the lens 9 with a drawing function is obtained (refer to drawing 10 e).

[0041] 3. It has the wall of a lens configuration for the imprint sheet 1, and arrange between the metal mold of the couple which becomes a part corresponding to the edge of a lens from the female mold 5 which has an exit hole 11, and a male 6 (refer to drawing 11 a). Next, the imprint sheet 1 is made to meet the configuration of a female mold 5 like the approach of 1. The lens ingredient 7 is injected and fabricated in metal mold from an exit hole 11 the mold closure back (refer to drawing 11 b) (refer to drawing 11 c). Next, the base sheet 2 of the imprint sheet 1 is

exfoliated from an aperture and a moldings 19 in metal mold, and the lens 9 with a drawing function is obtained (refer to drawing 11 d).

[0042] In addition, there is also a method of pushing in the imprint sheet 1 by the pin 12 which carried out the configuration which agrees with metal mold while applying heat, and making metal mold meet in addition to the approach of attracting air and making it meeting through the vacuum attraction opening 10 from the base sheet 2 side, applying heat as the imprint sheet 1 of the approach of the above 1-3 was shown in drawing 9 - drawing 11 in the process which metal mold is made meeting (refer to drawing 12 ). Moreover, the approach of drawing in and the approach of pressing a pin may be used together.

[0043] A crevice 13 is formed on the lens 9 with a drawing function, the imprint layer 4 is formed in a crevice 13, the lens 9 with a drawing function obtained by the above-mentioned approach is stopped down as the front face of the imprint layer 4, and lens 9 with a function front face does not have a level difference, and turns into the same side.

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OPERATION

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[Function] Since the lens with a drawing function and its manufacture approach of this invention were constituted as mentioned above, they have the next operation.

[0045] The part into which the ultraviolet-rays discoloration layer colored from the lens periphery with a drawing function, and it colored the ultraviolet-rays discoloration layer prepared in the lens front face when the amount of ultraviolet rays increased, since the concentration at the time of coloring constituted the lens with a drawing function of this invention like [ it is high and ] as it approached the lens periphery intercepts light for the role of drawing sure enough (refer to drawing 1 ). If the amount of ultraviolet rays decreases, coloring concentration will decrease from a part for a lens center section with a drawing function (decolorization), there will be much light and close will come (refer to drawing 2 ) to come.

[0046] Moreover, since the manufacture approach of the lens with a drawing function this invention was constituted so that a base sheet might be exfoliated after it stuck the imprint sheet into the lens or the lens ingredient, an ultraviolet-rays discoloration layer is formed in the location of arbitration.

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EXAMPLE

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[Example] Carried out the roll coat of the silicon system ink to polyester film with a thickness of 25 micrometers, it was made to dry at 150 degrees C for about 30 minutes, and the mold release layer was formed.

[0048] Next, the roll coat of the acrylic ink was carried out, and stratum disjunctum was formed.

[0049] Next, using the ultraviolet-rays allochroic ink of the presentation 1 shown below, the printing pattern of a with a bore outer diameter [ 6mm outer diameter of 4mm ] doughnut mold was printed with screen printing, and the 1st ultraviolet-rays discoloration layer was formed.

[0050] Next, using the ultraviolet-rays allochroic ink of the presentation 2 shown below, the printing pattern of a with a bore outer diameter [ 8mm outer diameter of 6mm ] doughnut mold was printed with screen printing, and the 2nd ultraviolet-rays discoloration layer was formed.

[0051] Next, using the ultraviolet-rays allochroic ink of the presentation 3 shown below, the printing pattern of a with a bore outer diameter [ 10mm outer diameter of 8mm ] doughnut mold was printed with screen printing, and the 3rd ultraviolet-rays discoloration layer was formed.

[0052] Next, using the acrylic ink of the presentation 4 shown below, it printed with screen printing and the glue line was formed.

[0053] Finally, it dried at 150 degrees C for about 5 minutes, and the imprint sheet was obtained.

[0054]

Presentation 1 (the 1st ultraviolet-rays allochroic ink)

Binder 700 by SEIKO advance incorporated company 60 % of the weight Dilution solvent Ethyl carbitol acetate 15 % of the weight Ultraviolet-rays discoloration matter Sunny color powder by record raw material research institute incorporated company 25 % of the weight [0055]

Presentation 2 (the 2nd ultraviolet-rays allochroic ink)

Binder 700 by SEIKO advance incorporated company 48 % of the weight Dilution solvent Ethyl carbitol acetate 12 % of the weight Ultraviolet-rays discoloration matter Sunny color powder by record raw material research institute incorporated company 40 % of the weight [0056]

Presentation 3 (the 3rd ultraviolet-rays allochroic ink)

Binder 700 by SEIKO advance incorporated company 42 % of the weight Dilution solvent Ethyl carbitol acetate 10 % of the weight Ultraviolet-rays discoloration matter Sunny color powder by record raw material research institute incorporated company 48 % of the weight [0057]

Presentation 4 (adhesion ink)

binder the Mitsubishi Rayon Co., Ltd. make -- BR-80 80 % of the weight Dilution solvent Ethyl carbitol acetate 20 % of the weight [0058] Thus, the obtained imprint sheet was used, and it laid in the lens front face made from polymethylmethacrylate, and pressed with the roll imprint



machine, and it exfoliated, the imprint sheet was extracted, and the lens with a function was obtained.

[0059] The following results were obtained, when [ which manufactured ] it extracted and the lens with a function was evaluated.

[0060] 1. It is Average Ultraviolet-Rays on-the-Strength 0.52 MV/cm<sup>2</sup> 1st Ultraviolet-Rays Allochroic Layer after Transparency at the Time of UV Irradiation on-the-Strength 2.0 MV/cm<sup>2</sup>. 2nd Ultraviolet-Rays [ of 90% Coloring ] Allochroic Layer 3rd Ultraviolet-Rays [ of 100% Coloring ] Allochroic Layer 100% Coloring [0061] 2. It is Average Ultraviolet-Rays on-the-Strength 0.45 MV/cm<sup>2</sup> 1st Ultraviolet-Rays Allochroic Layer after Transparency at the Time of UV Irradiation on-the-Strength 1.0 MV/cm<sup>2</sup>. It Does Not Color but is 2nd Ultraviolet-Rays Allochroic Layer. 3rd Ultraviolet-Rays [ of 20% Coloring ] Allochroic Layer 100% Coloring [0062] 3. It is Average Ultraviolet-Rays on-the-Strength 0.43 MV/cm<sup>2</sup> 1st Ultraviolet-Rays Allochroic Layer after Transparency at the Time of UV Irradiation on-the-Strength 0.5 MV/cm<sup>2</sup>. It Does Not Color but is 2nd Ultraviolet-Rays Allochroic Layer. It Does Not Color but is 3rd Ultraviolet-Rays Allochroic Layer. 5% Coloring [0063] The average ultraviolet-rays reinforcement after transparency became almost fixed at the time of UV irradiation reinforcement 0.5 – 2.0 mV/cm<sup>2</sup>.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the typical sectional view showing one example of the lens with a drawing function of this invention.

[Drawing 2] It is the typical sectional view showing one example of the lens with a drawing function of this invention.

[Drawing 3] It is the typical sectional view showing a part of one example of the lens with a drawing function of this invention.

[Drawing 4] It is the typical sectional view showing a part of one example of the lens with a drawing function of this invention.

[Drawing 5] It is the typical sectional view showing a part of one example of the lens with a drawing function of this invention.

[Drawing 6] It is the sectional view showing the imprint sheet used for the manufacture approach of the lens with a drawing function this invention.

[Drawing 7] It is the sectional view showing one example of the manufacture approach of the lens with a drawing function of this invention.

[Drawing 8] It is the perspective view showing one example of the lens with a drawing function of this invention.

[Drawing 9] It is the sectional view showing one example of the manufacture approach of the lens with a drawing function of this invention.

[Drawing 10] It is the sectional view showing one example of the manufacture approach of the lens with a drawing function of this invention.

[Drawing 11] It is the sectional view showing one example of the manufacture approach of the lens with a drawing function of this invention.

[Drawing 12] It is the sectional view showing the example of the process which makes an imprint sheet meet metal mold.

[Description of Notations]

1 Imprint Sheet

2 Base Sheet

3 Ultraviolet-Rays Discoloration Layer

4 Imprint Layer

5 Female Mold

6 Male

7 Lens Ingredient

8 Additive

- 9 Lens with Drawing Function
- 10 Vacuum Attraction Opening
- 11 Exit Hole
- 12 Pin
- 13 Crevice
- 14 Stratum Disjunctum
- 15 Glue Line
- 16 Pad for Hot Printing
- 18 Mold Release Layer
- 19 Moldings

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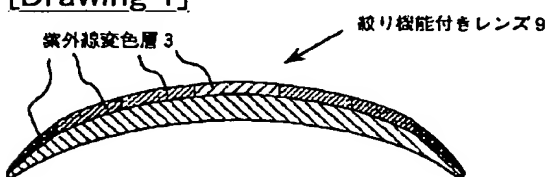
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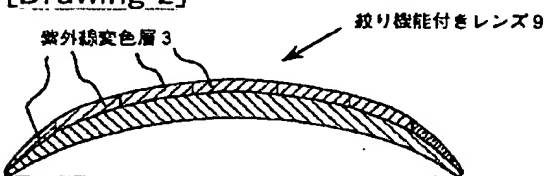
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## DRAWINGS

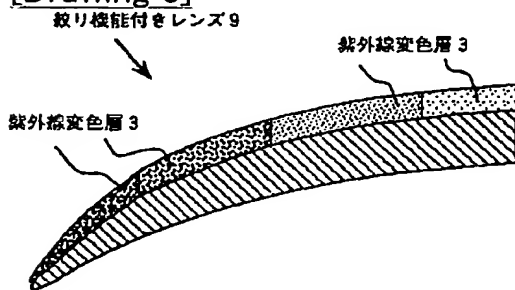
[Drawing 1]



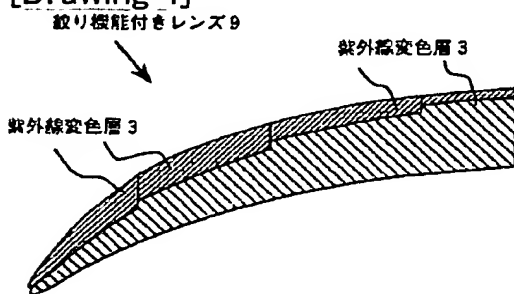
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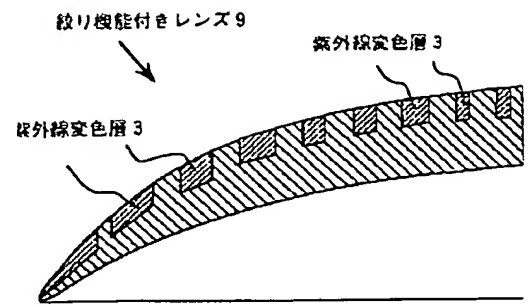
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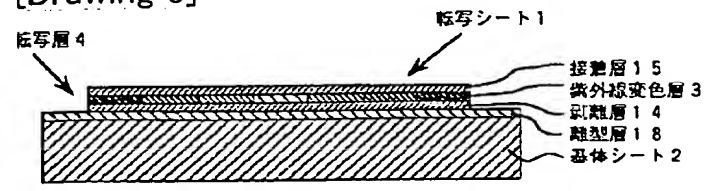
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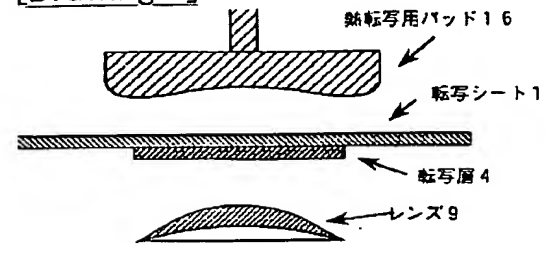
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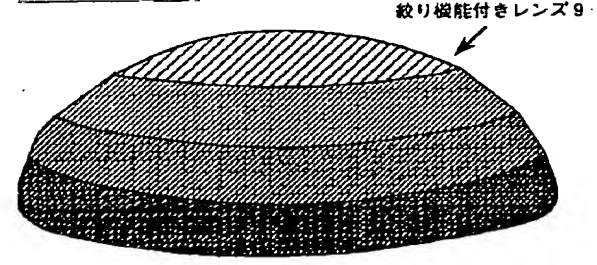
[Drawing 6]



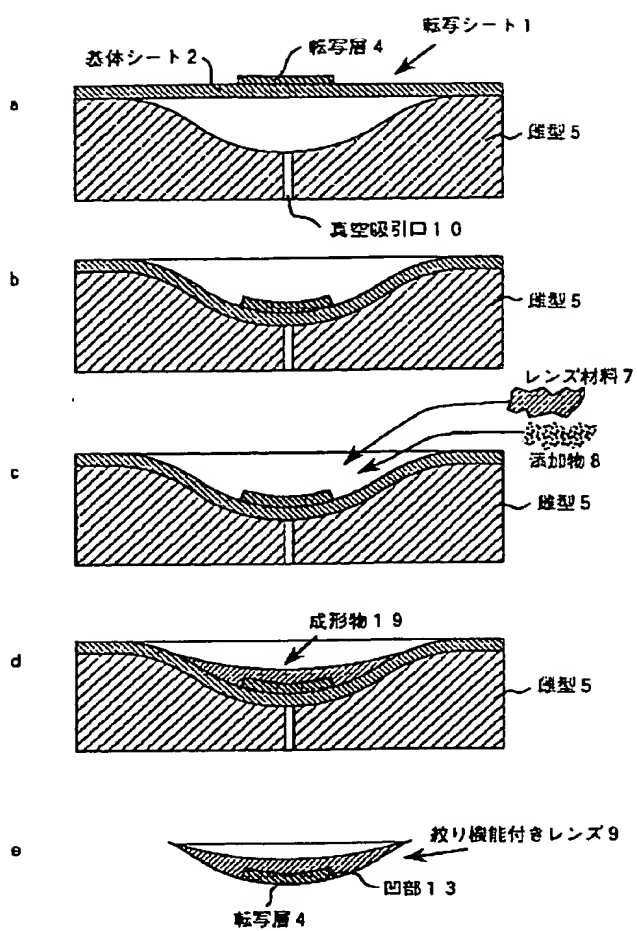
[Drawing 7]



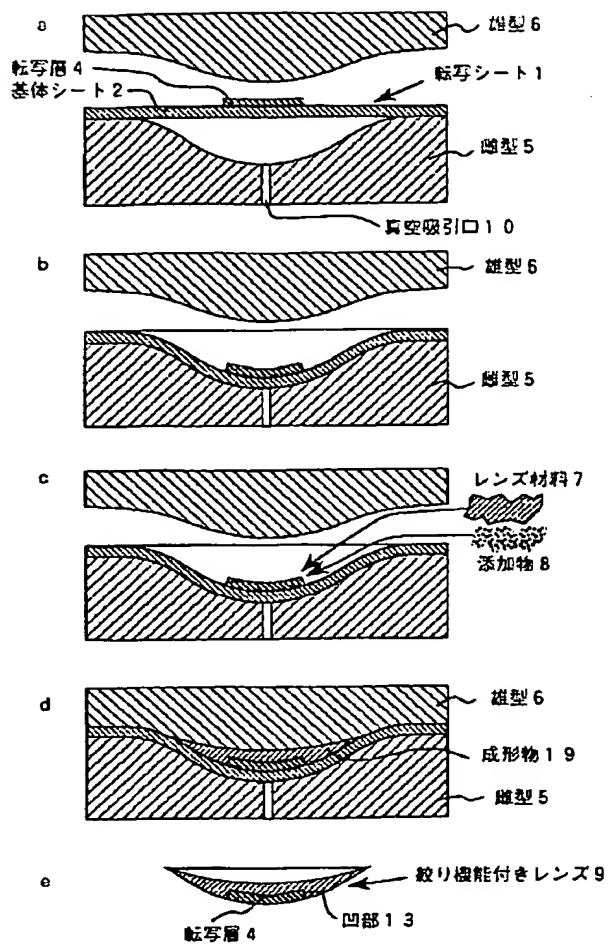
[Drawing 8]



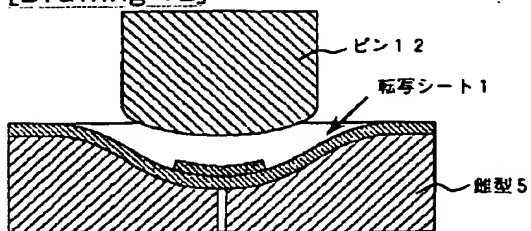
[Drawing 9]



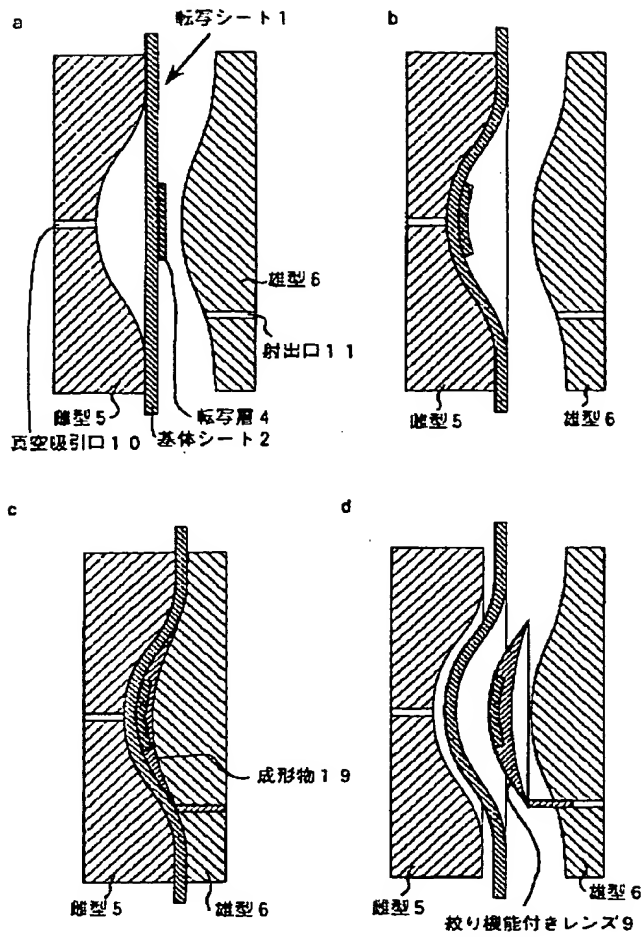
[Drawing 10]



[Drawing 12]



[Drawing 11]



[Translation done.]



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